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**TRANSLATION**

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Title of the Invention: CURSOR CONTROLLING DEVICE USING A  
PRESSURE-SENSITIVE RESISTOR

Taiwan Utility Model Application No. 84208321; June 16, 1995.

Inventor: Han-Che Wang

Applicant: Primax Electronic Ltd.

CURSOR CONTROLLING DEVICE USING A  
PRESSURE-SENSITIVE RESISTOR

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a cursor controlling device, and more particularly to a cursor controlling device using a pressure-sensitive resistor.

Description of the Related Art

Generally, conventional cursor controlling devices, such as a mouse and a track ball, all utilize rolling balls, raster wheels, light emitting diodes, photo transistors, etc. to detect the movement of a cursor. However, the above-stated elements have certain limitations on, such as, the stability of the rotated raster wheels, the number of openings and resolutions of the raster wheels, the ranges and the stability of lights emitted by light emitting diodes and the demands of synchronous rotations between the rolling balls and raster wheels. Consequently, it is desired to improve the conventional cursor controlling devices.

In addition, the conventional cursor controlling devices all need power lines to connect computers or are arranged on the cases of the computers (for example, notebook computers). Therefore, the use of the conventional cursor controlling devices is limited to spaces. Today, multimedia computers are extremely popular. If a speaker intends to express the applications relating to a multimedia computer, the speaker must close to the computer to operate a conventional cursor controlling device. As a result, it greatly limits the moving space of the speaker and affects the process of the speech.

SUMMARY OF THE INVENTION

A main object of the invention is to provide a cursor controlling device using a pressure-sensitive resistor. The cursor controlling device of the invention uses a pressure-sensitive resistor to detect the movement of a cursor thereby to prevent disadvantages of the conventional optical

mouse.

Another object of the present invention is to provide a cursor controlling device using a pressure-sensitive resistor. The cursor controlling device of the invention can remotely control the movement of a cursor of a computer so as to expand the moving space of users.

A further object of the invention is to provide a cursor controlling device using a pressure-sensitive resistor. The cursor controlling device of the invention has more extra functions to conduce to the applications of multimedia systems.

A cursor controlling device using a pressure-sensitive resistor according to the present invention is used to control the movement of a cursor on the screen of a computer. The cursor controlling device comprises a pressure-sensitive resistor having a resistance value varying with different pressures applied thereon; and a microprocessor electrically connected to the pressure-sensitive resistor for receiving and processing the resistant value to generate a cursor controlling signal so as to control the movement of the cursor.

Preferably, the microprocessor comprises an automatic switch scanning circuit electrically connected to the pressure-sensitive resistor for detecting the resistant value, an analog-to-digital converter electrically connected to the automatic switch scanning circuit for converting the resistant value into a digital signal and a central processor electrically connected to the analog-to-digital converter for receiving and processing the digital signal so as to control the movement of the cursor.

Preferably, the cursor controlling device further comprises an infrared emitter electrically connected to the microprocessor for emitting the cursor controlling signal to a decoder of the computer so as to remotely control the movement of the cursor, and a power supply device for supplying power source to the cursor controlling device.

The cursor controlling device using a pressure-sensitive resistor is arranged in a housing. On the surface of the housing are a cursor controlling push button for applying different pressures onto the pressure-sensitive resistor, and a set of functional push buttons, wherein the microprocessor executes a function corresponding to a functional push button pressed by users.

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block circuit diagram showing a cursor controlling device using a pressure-sensitive resistor according to a first preferred embodiment of the invention;

Fig. 2 is a graph showing a relationship between pressure and resistance of a pressure-sensitive resistor;

Fig. 3 is a block circuit diagram showing a cursor controlling device using a pressure-sensitive resistor according to a second preferred embodiment of the invention; and

Fig. 4 is a schematic diagram showing a housing of a cursor controlling device using a pressure-sensitive resistor according to a preferred embodiment of the invention.

## DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 1, it is shown a schematic block circuit diagram of a cursor remote controlling device according to a first preferred embodiment of the invention. In Fig. 1, reference numeral 1 designates a cursor controlling device and reference numeral 2 designates a decoder arranged in a computer. The cursor controlling device 1 includes a pressure-sensitive resistor 11, an automatic switch scanning circuit 12, an analog-to-digital converter 13, a central processor (CPU) 14, an infrared emitter 15 (having a driver 151), a battery 16, a primary push button 17 and secondary push buttons 18.

The pressure-sensitive resistor 11 has a resistance value varying with different pressures applied thereon. Fig. 2 is a graph showing a relationship between pressure and resistance of the pressure-sensitive resistor 11. The pressure-sensitive resistor 11 is divided into 4 regions 111, 112, 113 and 114. Each region represents a moving direction (up, down, left or right). It is assumed that the region 111 indicates an movement in an up direction. When a user presses the region 111, a corresponding cursor moves up. The more the pressure is applied, the faster the cursor moves, and the like. The automatic switch scanning circuit 12 repeatedly scans four switches 121, 122, 123 and 124 to detect a region of the pressure-sensitive resistor pressed. The analog-to-digital converter 13 converts a scanning result into a digital signal. Then, The

central processor 14 receives the digital signal and generates a cursor controlling signal. The central processor 14 outputs the cursor controlling signal, and then, the infrared emitter 15 emits the cursor controlling signal to the decoder 2 to control the movement of the cursor on the screen of the computer. The battery 16 supplies power source needed for controlling the movement of the cursor. The primary push button 17 and the secondary push buttons 18 are electrically connected to the central processor 14. A signal generated by pressing the primary push button 17 or the secondary push buttons 18 is executed by the central processor 14, and then emitted by the infrared emitter 15. If there is no need to control the cursor in a remote way, it is unnecessary to have the battery 16. In this case, power source can be supplied by connecting a power line to the computer.

Based on the first preferred embodiment of the invention, the following application is developed. Referring to Figs. 3 and 4, Fig. 3 shows a block circuit diagram of a cursor controlling device using a pressure-sensitive resistor according to the second preferred embodiment of the invention, and Fig. 4 shows a housing of a cursor controlling device using a pressure-sensitive resistor according to a preferred embodiment of the invention. In Fig. 3, reference numeral 21 designates a pressure-sensitive resistor, reference numeral 22 designates a microprocessor, reference numeral 23 designates a battery, reference numeral 24 designates an infrared emitter and reference numeral 25 designates a set of functional push buttons. The pressure-sensitive resistor 21 includes four resistors 211-214. The infrared emitter 24 has a driver 241. Fig. 4 shows a housing 41 having a plurality of functional push buttons 25 and a cursor controlling push button 411 arranged thereon.

The cursor controlling device of the present invention uses the pressure-sensitive resistor to remotely control the movement of a cursor. In addition, the cursor controlling push button 411 can be arranged on the housing 41 of the cursor controlling device. Just to press the cursor controlling push button 411, the movement of the cursor can be controlled, and functional push buttons 25 (in Fig. 4) is used to allow the user to have different selections. In the second preferred embodiment, the automatic switch scanning circuit 12, the analog-to-digital converter 13 and the central processor (CPU) 14 of the first preferred embodiment are replaced with the microprocessor 22. Moreover, in the second embodiment, the

microprocessor 22 can execute the functions of the functional push buttons 25, such as the functions of the primary and secondary push buttons of a mouse and other functions (magnifier, telestrator, play, stop, rewind, volume control, channel control and hot key, and so on).

5 Currently, multimedia computers are popular. The second preferred embodiment provides various functional push buttons to conduce to conveniences for operating multimedia systems and variety in applications. The secondary push buttons can be arranged on the right and left sides of the bottom of the housing 41 so as to facilitate the  
10 operations of the push buttons when holding the housing 41 is held.

In summary, the present invention is to provide a device using a pressure-sensitive resistor to detect the movement of a cursor, thereby avoiding disadvantages of the conventional rolling balls, raster wheels, photo transistors, light emitting diodes. Since a curve showing the  
15 relationship between pressure and resistance of the pressure-sensitive resistor is continuous, the speed of the movement of the cursor depends on the variations of pressures applied thereon. Furthermore, the cursor controlling device can allow users to remote control the movement of the cursor in wide spaces. For example, at a conference for presenting a  
20 multimedia computer, a user can remotely control a cursor of the computer without limitations caused by the location of the computer. This will greatly make the conference proceed in a smooth way. Furthermore, the cursor controlling device of the present invention is arranged with extra functional push buttons for high-level applications.

25 Although the invention has been disclosed in terms of a preferred embodiment, the disclosure is not intended to limit the invention. Those skilled in the art can make modifications within the scope and spirit of the invention which is determined by the claims below.

WHAT IS CLAIMED IS:

1. A cursor controlling device using a pressure-sensitive resistor, for controlling the movement of a cursor on the screen of a computer, comprising:

a pressure-sensitive resistor having a resistance value varying with pressures applied thereon; and

a microprocessor electrically connected to the pressure-sensitive resistor for receiving and processing the resistant value to generate a cursor controlling signal.

2. The cursor controlling device as claimed in claim 1, wherein the microprocessor comprises:

an automatic switch scanning circuit electrically connected to the pressure-sensitive resistor for detecting the resistant value;

an analog-to-digital converter electrically connected to the automatic switch scanning circuit for converting the resistant value into a digital signal;

a central processor electrically connected to the analog-to-digital converter for receiving and processing the digital signal so as to control the movement of the cursor.

3. The cursor controlling device as claimed in claim 2, further comprising:

an infrared emitter electrically connected to the microprocessor for emitting the cursor controlling signal to a decoder of the computer so as to remotely control the movement of the cursor; and

a power supply device for supplying power to the cursor controlling device using a pressure-sensitive resistor.

4. The cursor controlling device as claimed in claim 3, wherein the sensor controlling device using a pressure-sensitive resistor is disposed in a housing, and on the surface of the housing are:

a cursor controlling push button for applying different pressures onto the pressure-sensitive resistor; and

a set of functional push buttons, wherein the microprocessor executes a function corresponding to a functional push button pressed by a user.



WHAT IS CLAIMED IS: (AMENDED CLAIMS ON MARCH, 1997)

1. A cursor controlling device using a pressure-sensitive resistor,  
5 for controlling the movement of a cursor on the screen of a computer,  
comprising:

a pressure-sensitive resistor having a resistance value varying with  
pressures applied thereon;

a microprocessor electrically connected to the pressure-sensitive  
10 resistor for receiving and processing the resistant value to generate a  
cursor controlling signal;

an infrared emitter electrically connected to the microprocessor for  
emitting the cursor controlling signal to a decoder of the computer so as  
to remotely control the movement of the cursor; and

15 a power supply device for supplying power to the cursor controlling  
device using a pressure-sensitive resistor.

2. The cursor controlling device as claimed in claim 1, wherein the  
microprocessor comprises:

20 an automatic switch scanning circuit electrically connected to the  
pressure-sensitive resistor for detecting the resistant value;

an analog-to-digital converter electrically connected to the automatic  
switch scanning circuit for converting the resistant value into a digital  
signal;

25 a central processor electrically connected to the analog-to-digital  
converter for receiving and processing the digital signal so as to control  
the movement of the cursor.

3. The cursor controlling device as claimed in claim 1, wherein the  
30 sensor controlling device using a pressure-sensitive resistor is disposed in  
a housing, and on the surface of the housing are:

a cursor controlling push button for applying different pressures onto  
the pressure-sensitive resistor; and

35 a set of functional push buttons, wherein the microprocessor executes  
a function corresponding to a functional push button pressed by a user.

## ABSTRACT OF THE DISCLOSURE

5 The invention relates to a cursor controlling device using a pressure-sensitive resistor for controlling the movement of a cursor on the screen of a computer. In the present invention, a pressure-sensitive resistor is used to control the movement of the cursor thereby to avoid disadvantage of an optical encoding mouse. Furthermore, the cursor controlling device of the present invention can allow users to flexibly remotely control the cursor in wide spaces. The cursor controlling  
10 device of the present invention also provides extra functions to conduce to the applications of multimedia systems.

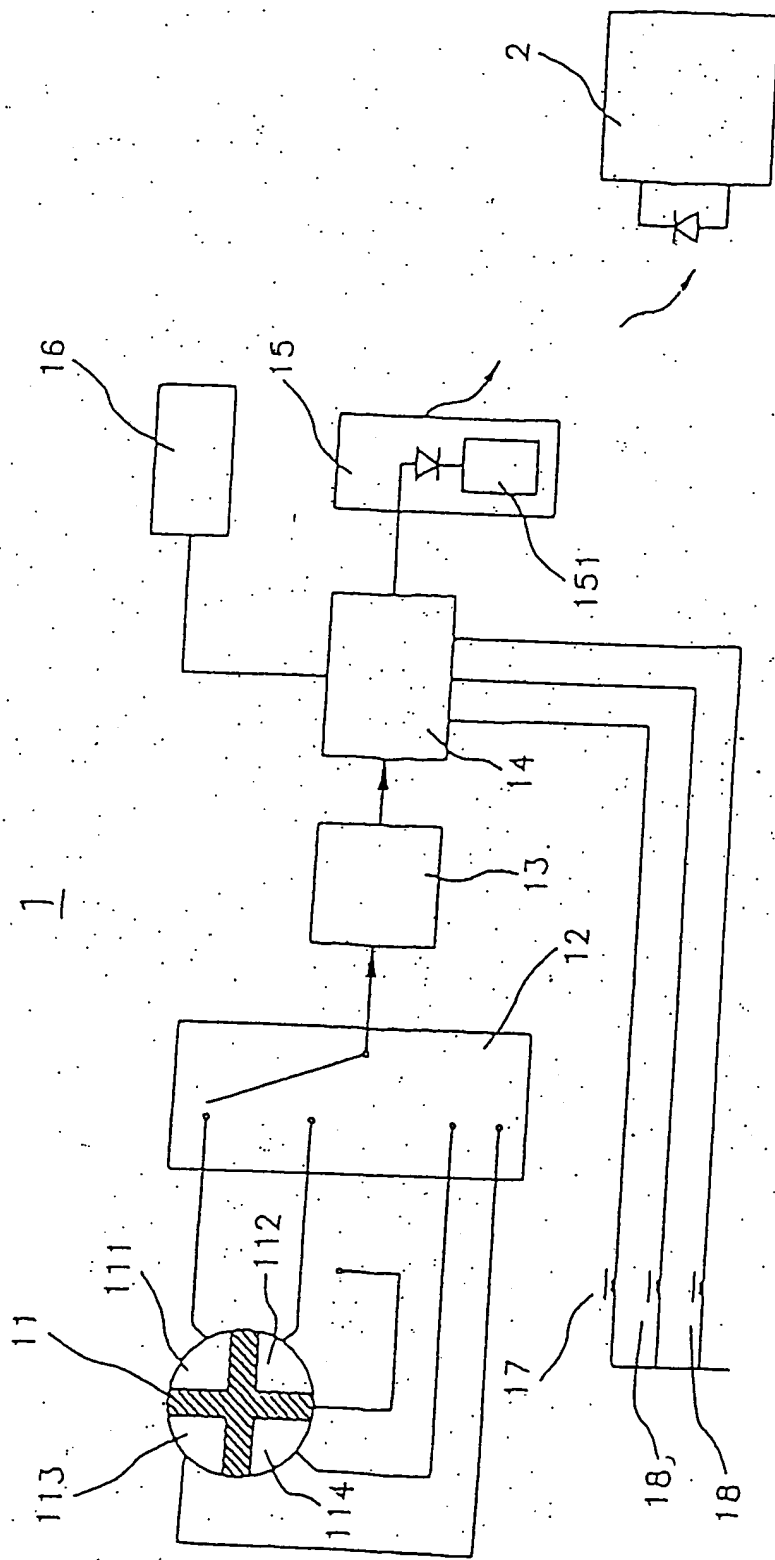


Fig. 1

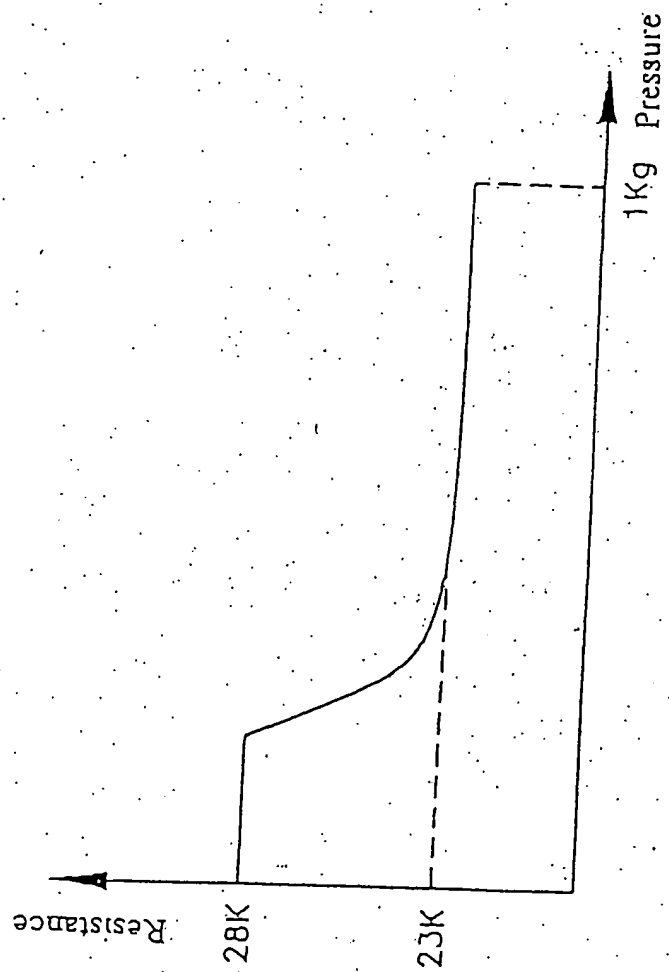


Fig. 2

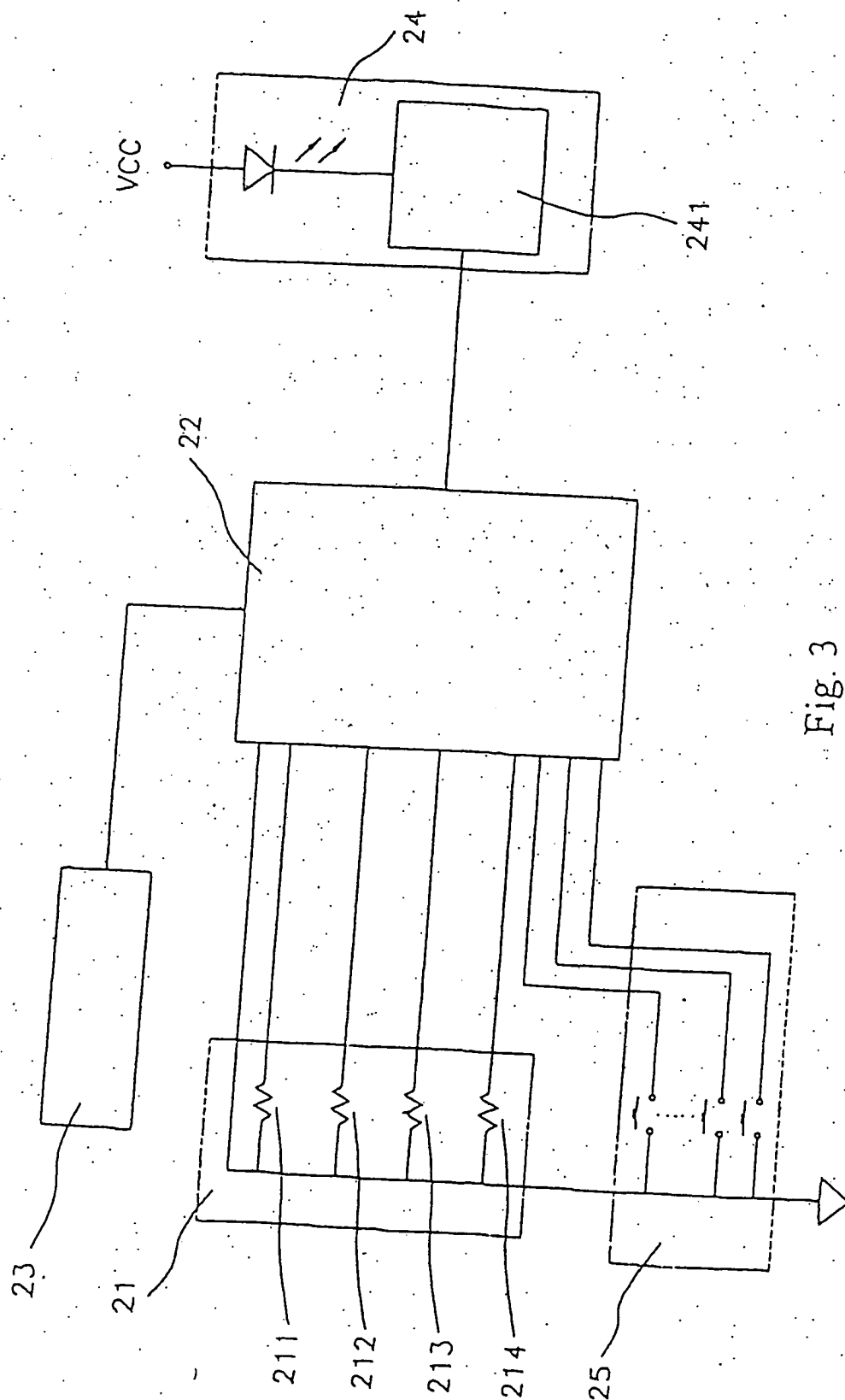


Fig. 3

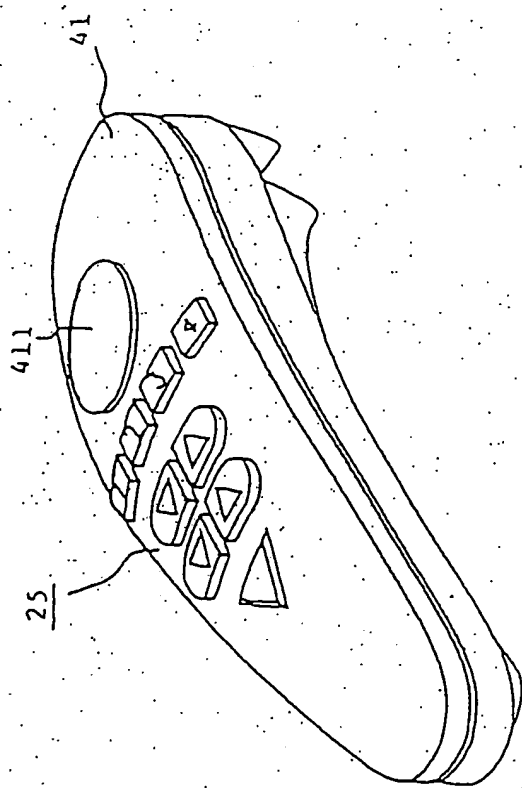


Fig. 4